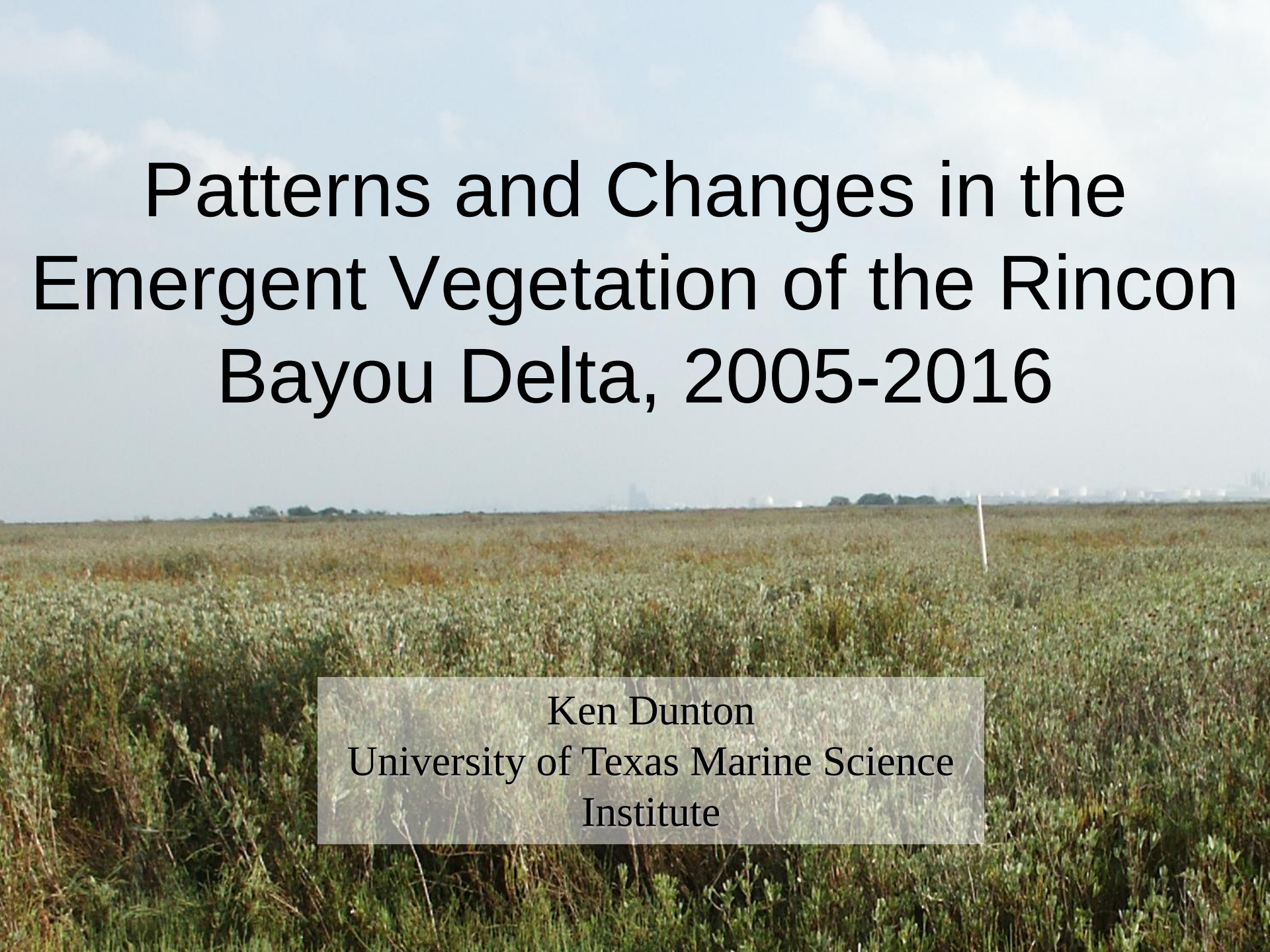
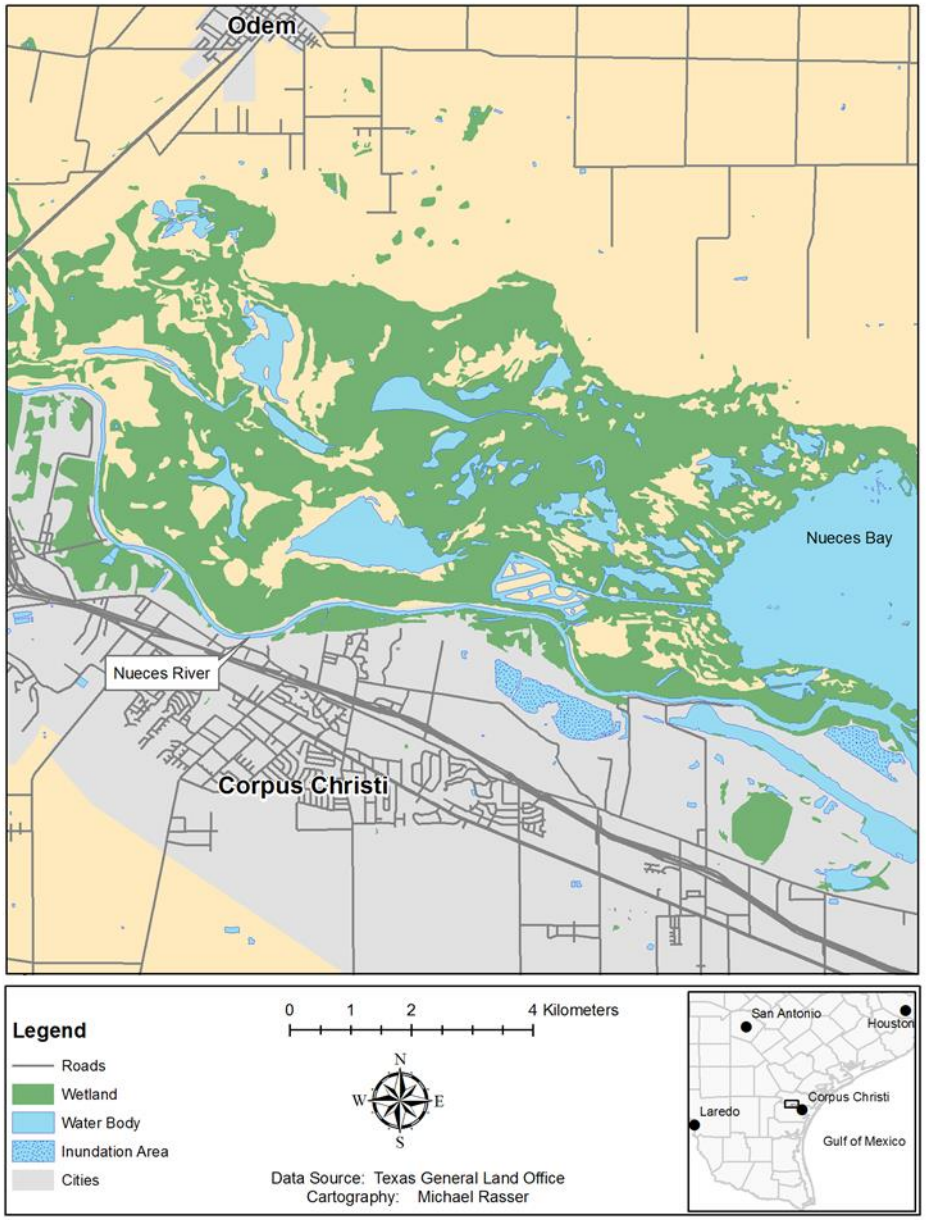
Patterns and Changes in the Emergent Vegetation of the Rincon Bayou Delta, 2005-2016



Ken Dunton
University of Texas Marine Science Institute

TWDB Project Goal:

To characterize changes in landscape vegetation patterns in the Nueces River Delta, Texas utilizing remote sensing and geospatial analysis



Introduction

- Rapid erosion is taking place along the Nueces Delta Shoreline

- The erosion has caused breaching and allowed intrusion of Nueces Bay waters into brackish water ponds, further exacerbating wetland loss

Photo courtesy of Kim Jackson

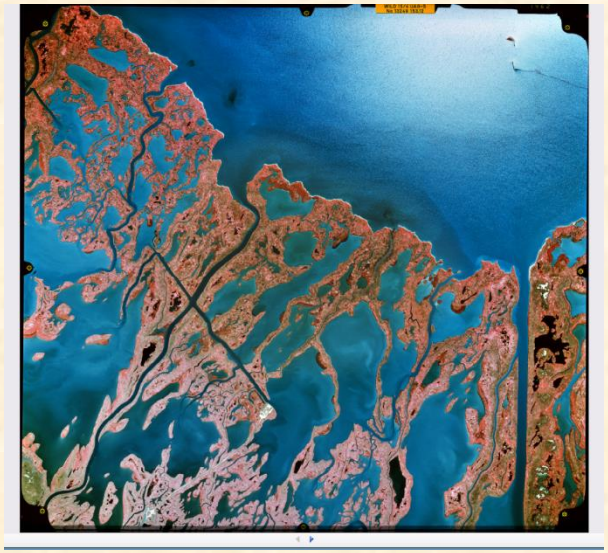
Objectives

The major objective of the overall project, funded by TWDB, is to

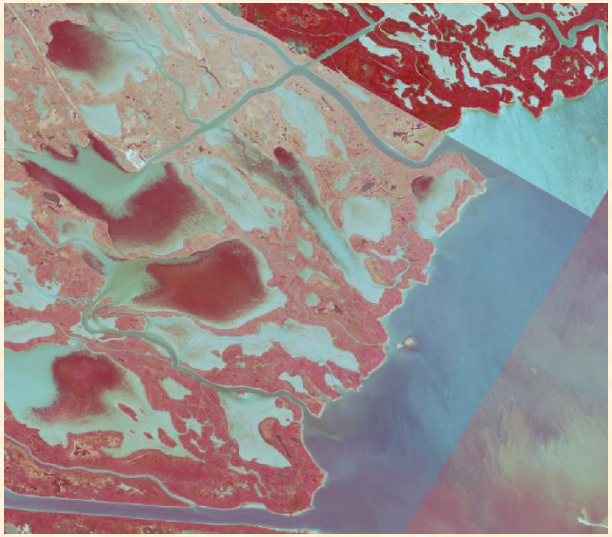
(1) Identify changes in the vegetative areal extent of the Nueces Delta through analysis of new imagery with historical (2005) imagery, and
(2) Determine extent and rate of shoreline loss.

CBBEP has funded the acquisition of high-resolution digital camera imagery of the same quality as employed in 2005. Thank you Ray Allen!!!!!!

1997



2005



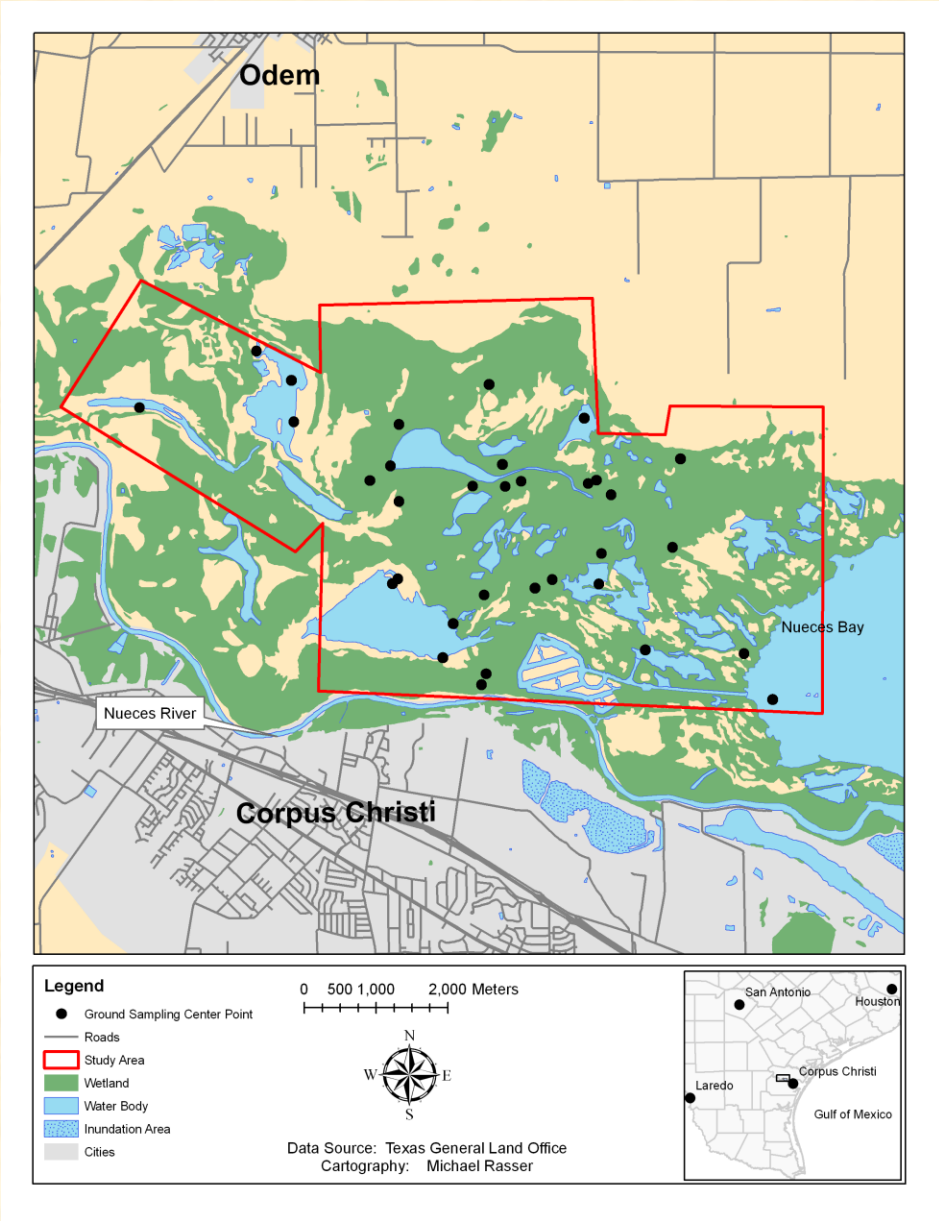
CIR Orthoganal Imagery

Digital Mapping Camera (Z/I Intergraph DMC)

- Simultaneously acquires True-Color, Infrared, and Black and White Imagery.
- Pixel resolution of 1 foot ground sample distance
- Stereoscopic (60% forward overlap, 30% sidelap) coverage no greater than 10,000 foot AGL
- Imagery is orthorectified
- Camera equipped with airborne GPS and inertial measurement unit

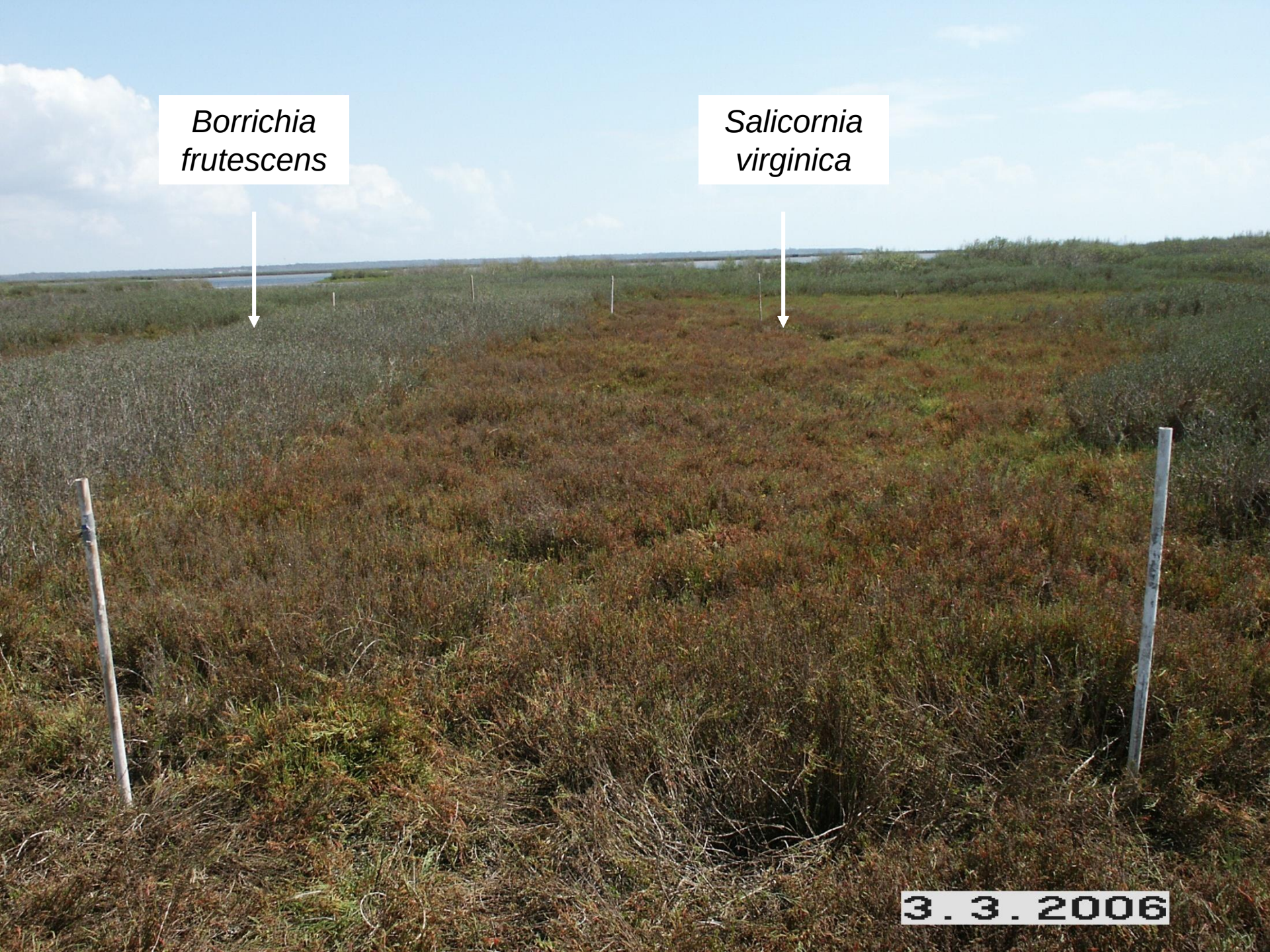
Ground Data Sampling Design

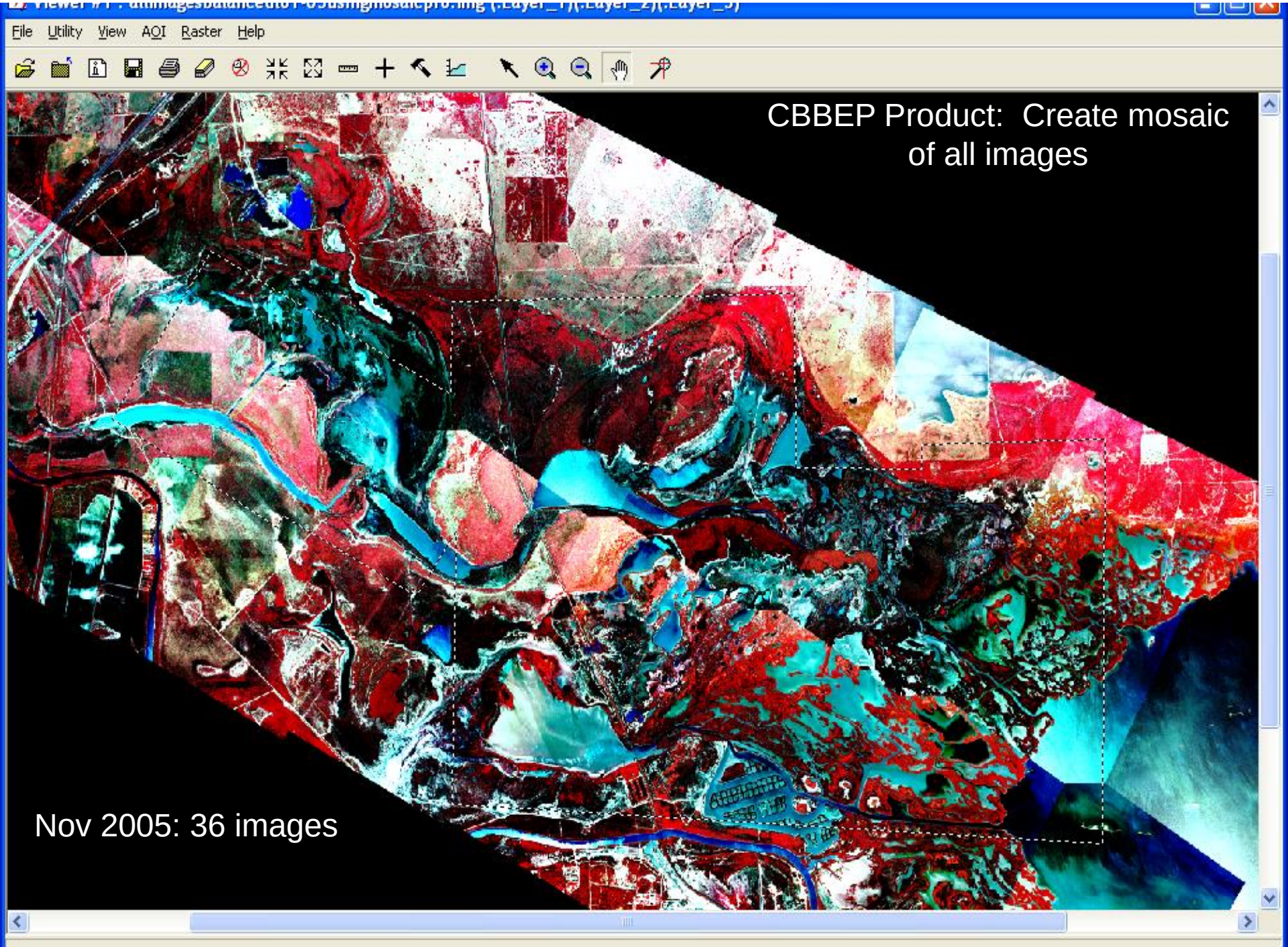
- Clustered sampling approach
- 32 random points
- 16 random sampling locations within 200 meters of clusters will yield 512 sampling locations

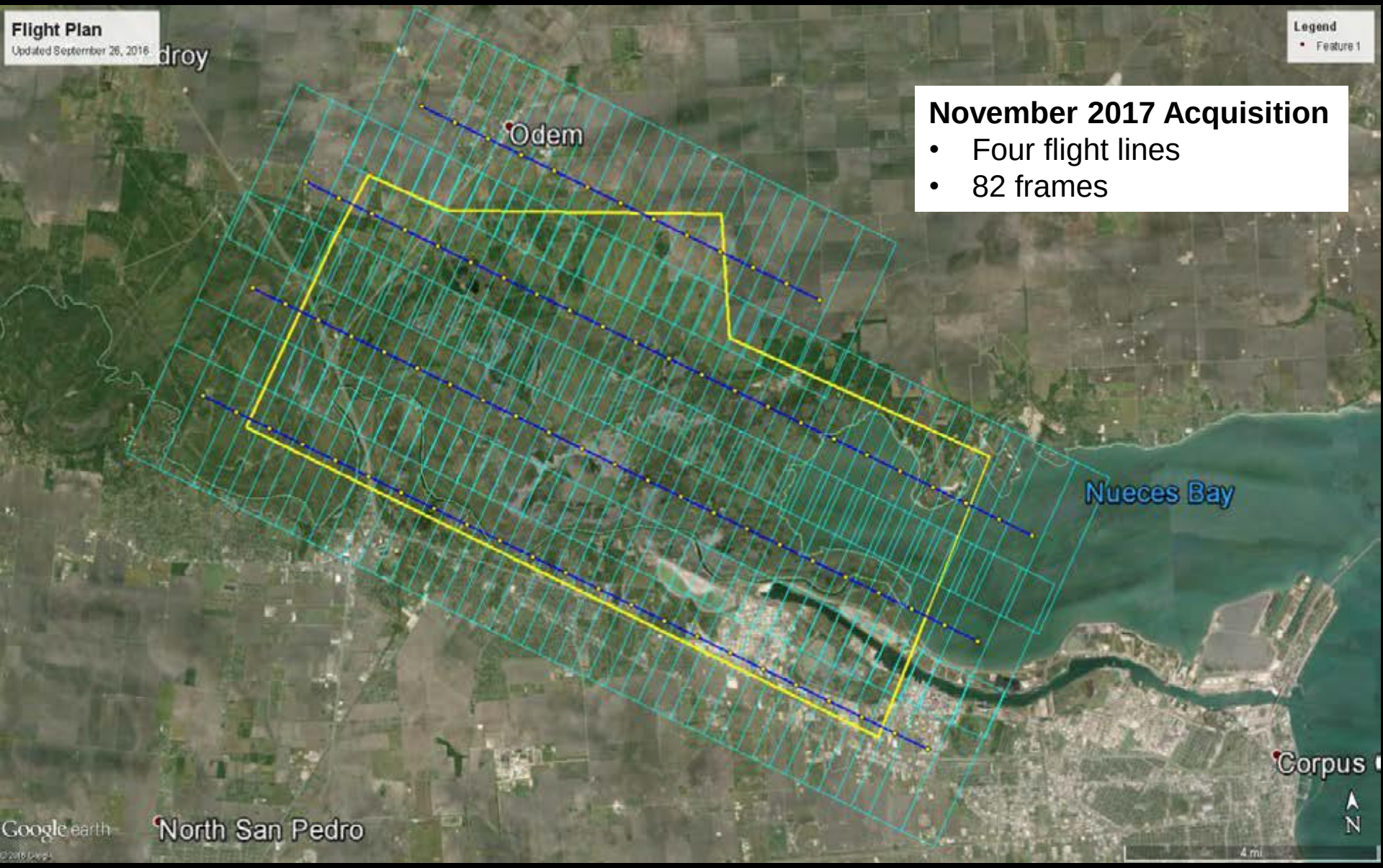



Tidal Creek

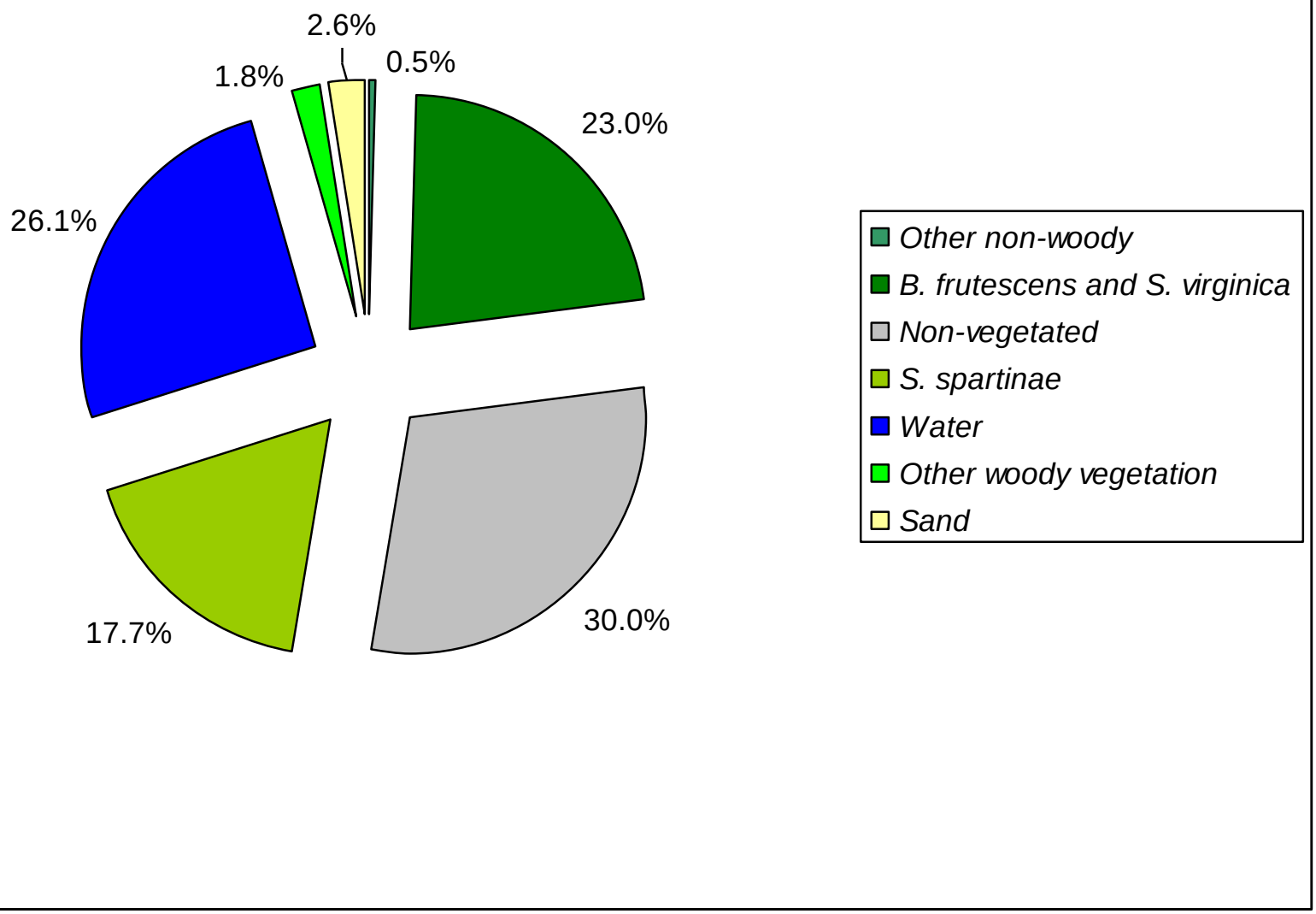

Salt Pan


Borrichia frutescens
Salicornia virginica
3.3.2006

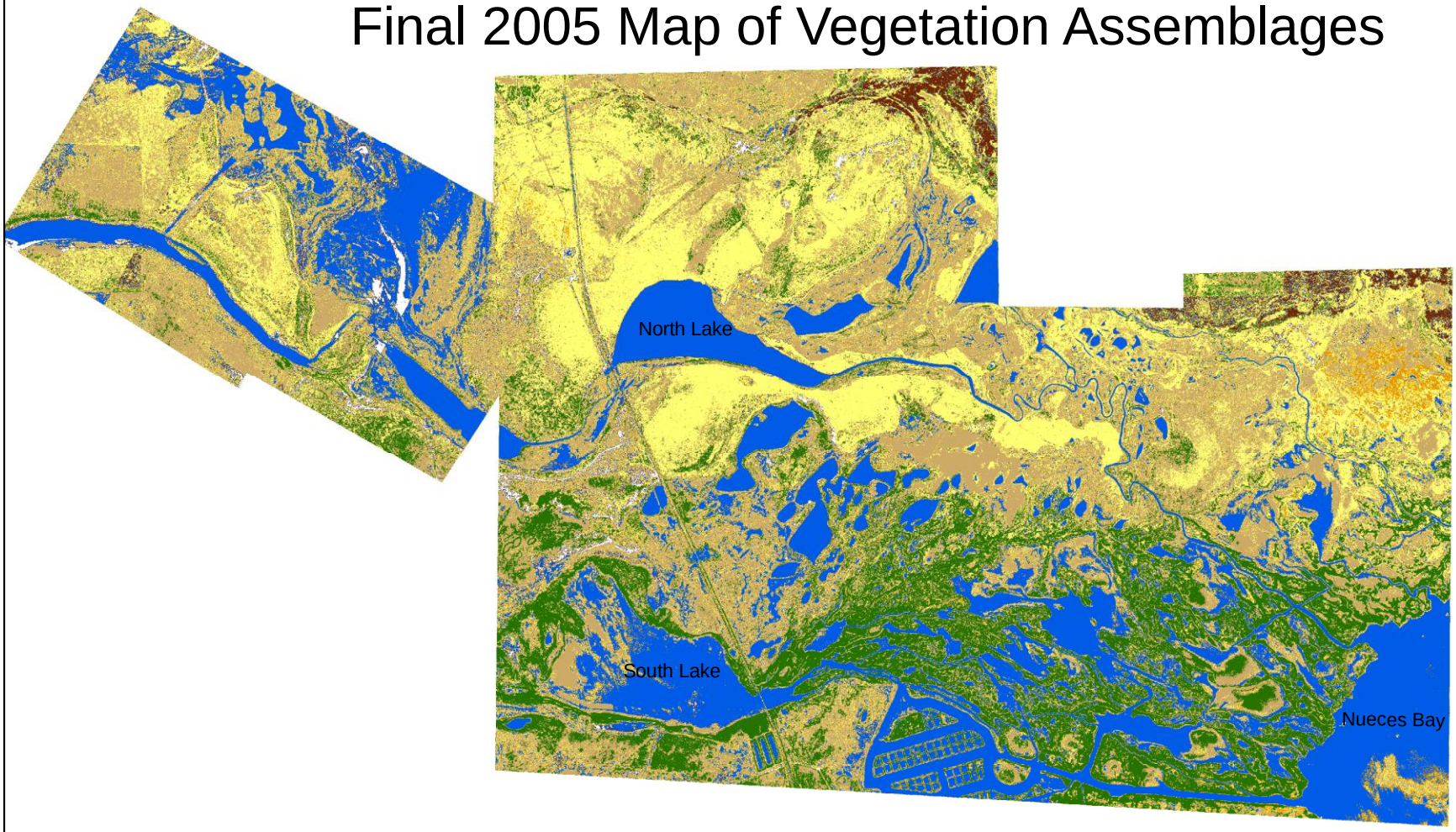

File Utility View AOI Raster Help
CBBEP Product: Create mosaic of all images
Nov 2005: 36 images


Flight Plan
Updated September 26, 2016
Legend
Feature 1
November 2017 Acquisition
• Four flight lines
• 82 frames
Odem
Nueces Bay
Corpus
North San Pedro
Google earth
N
4 mi

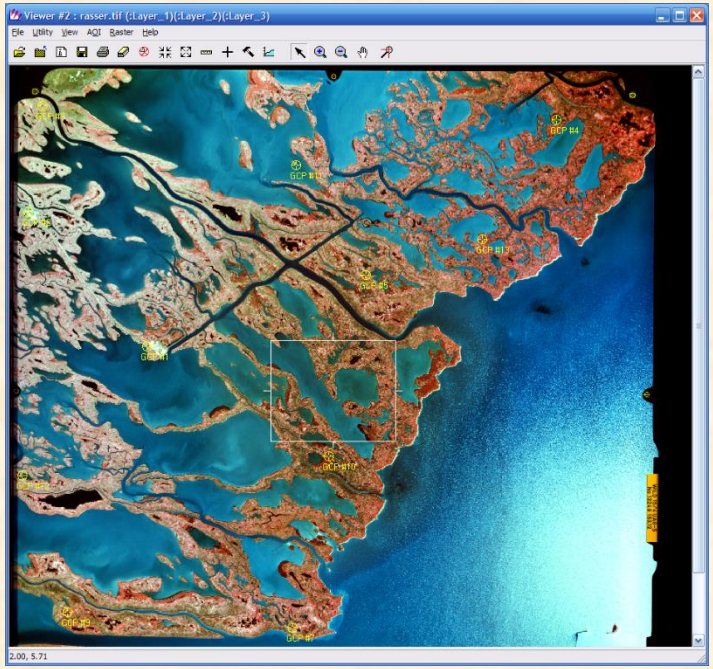
Mapped Vegetation Categories

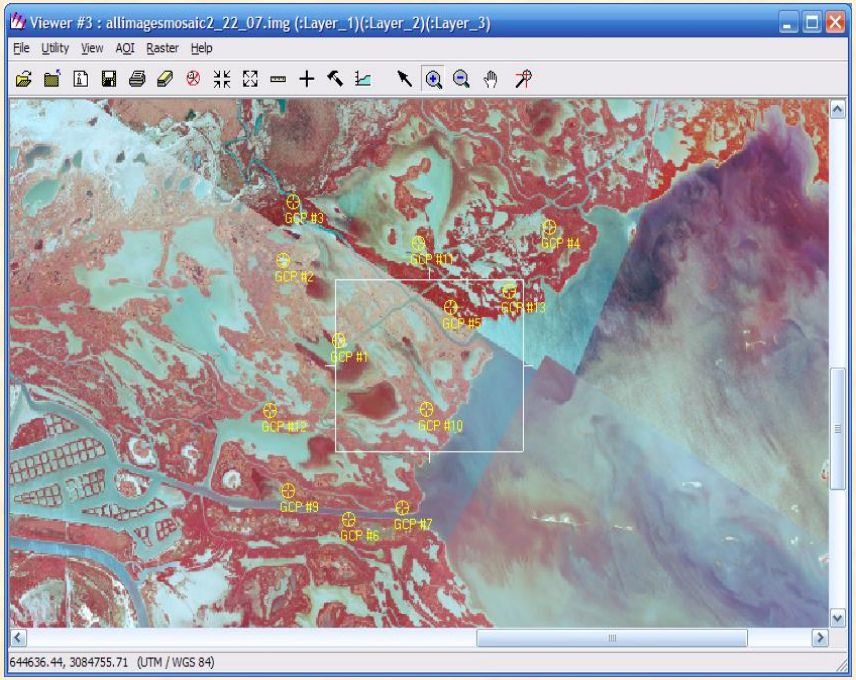


Final 2005 Map of Vegetation Assemblages



Shoreline Erosion: Image Rectification



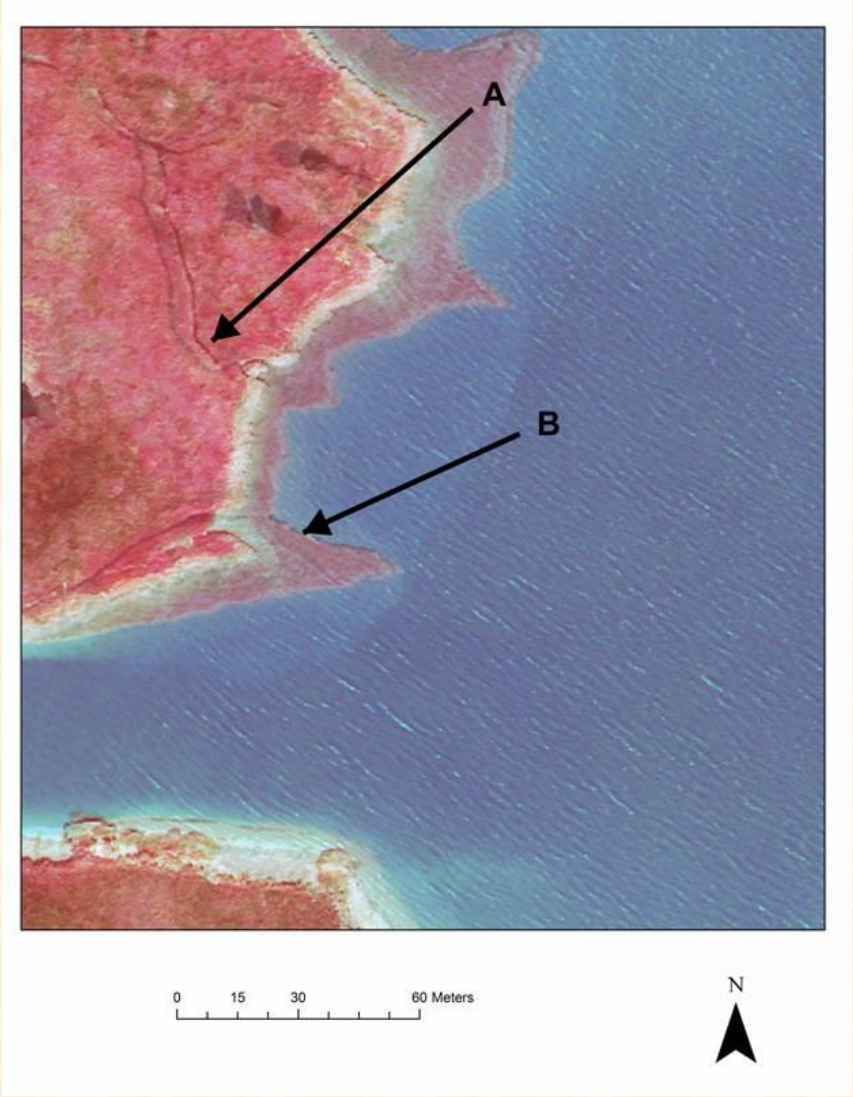


- 12 ground control points

- Images matched using polynomial algorithm in image processing software.

Results (1997-2005)

- The average shoreline retreat was 20.15 m or about 2.5 m/year
- There was an estimated 215,572.5 m^2 (53.3 acres) of marsh in 1997 and 174611.2 m^2 (43.15 acres) in 2005, a net loss of 10.15 acres.
- The rate of shoreline area loss in the study area is roughly 1.27 acres per year.

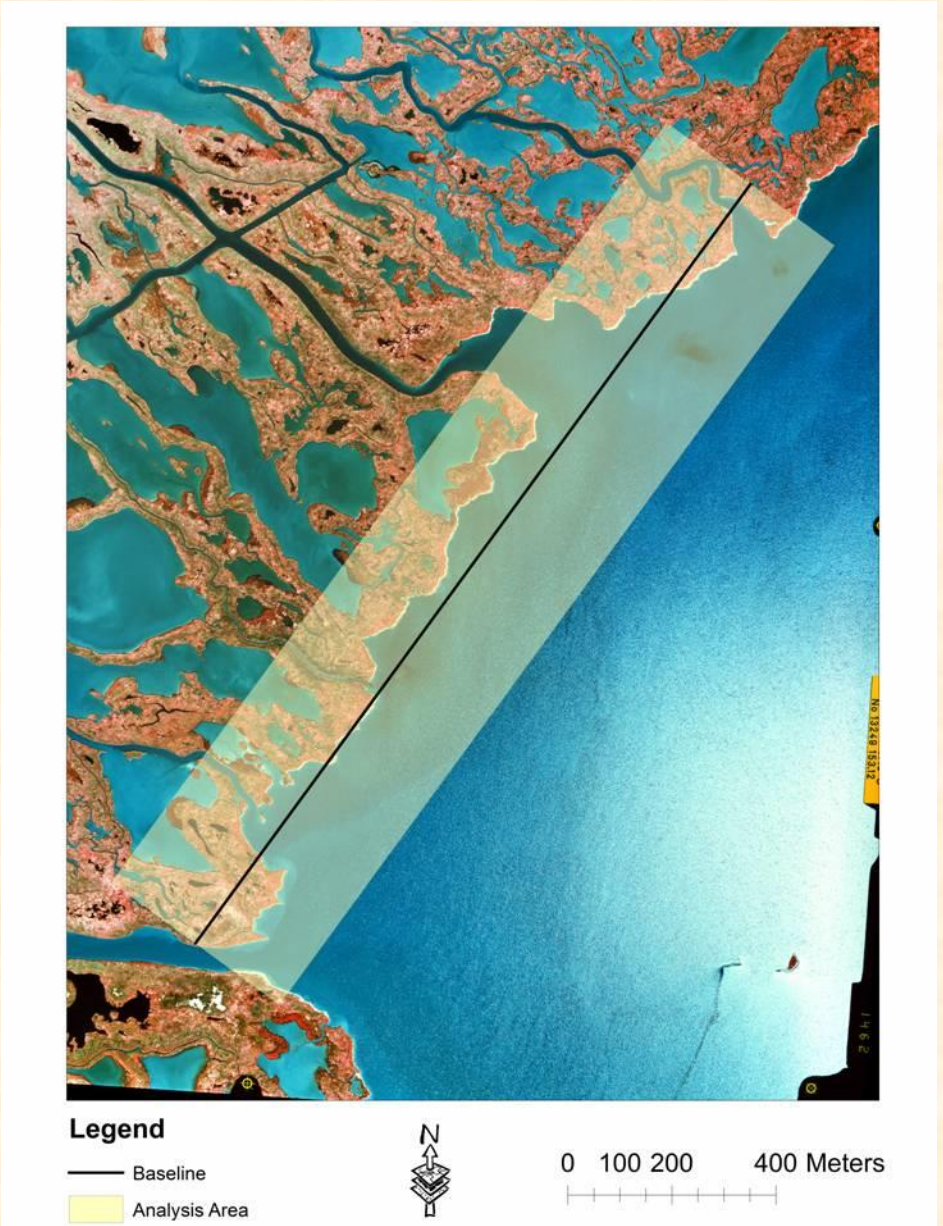


Questions?

EXTRA SLIDES

Creation of Shoreline GIS Layers

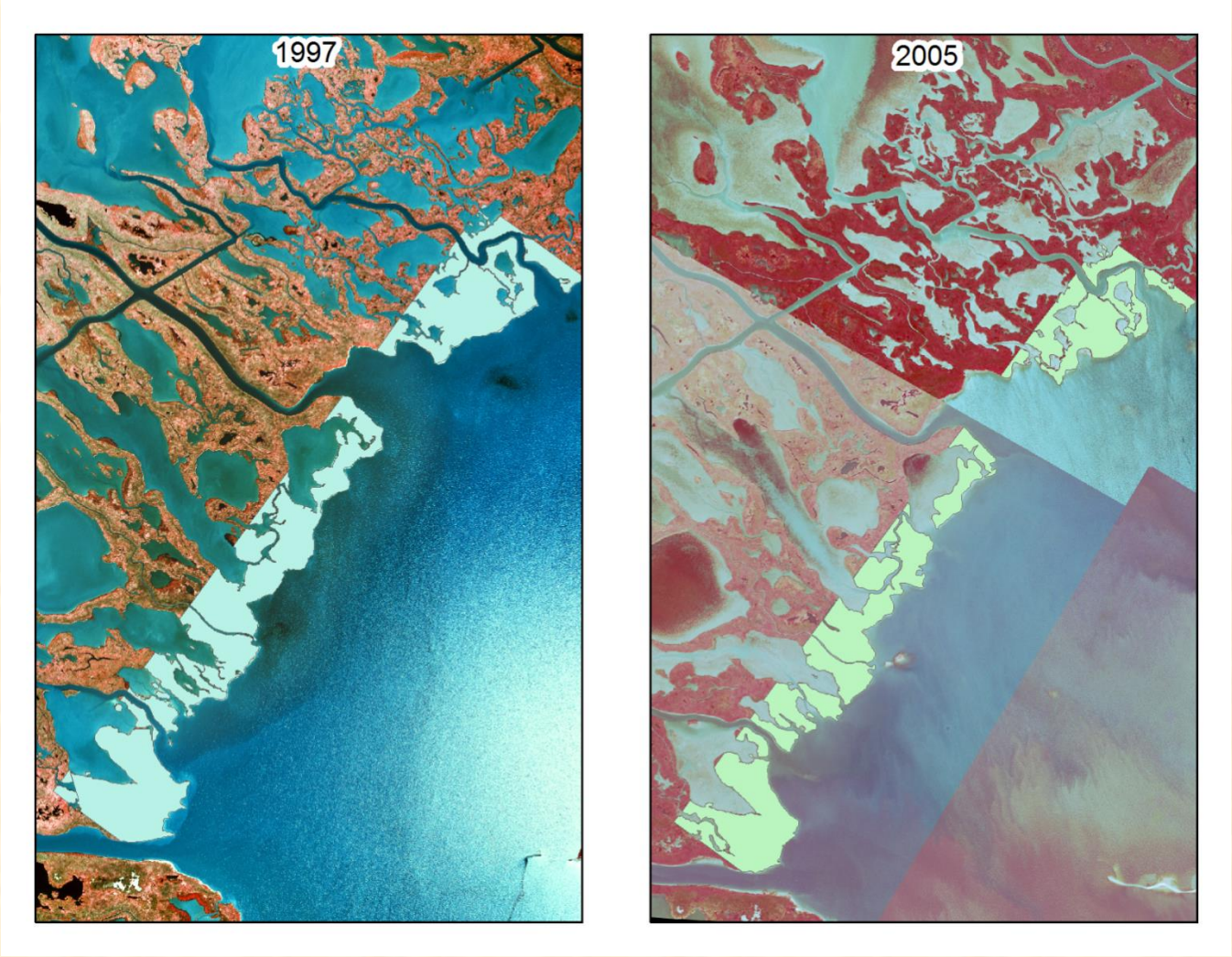
- Baseline drawn parallel to shoreline.
- 200 meter buffer on each side to bound the area of analysis.



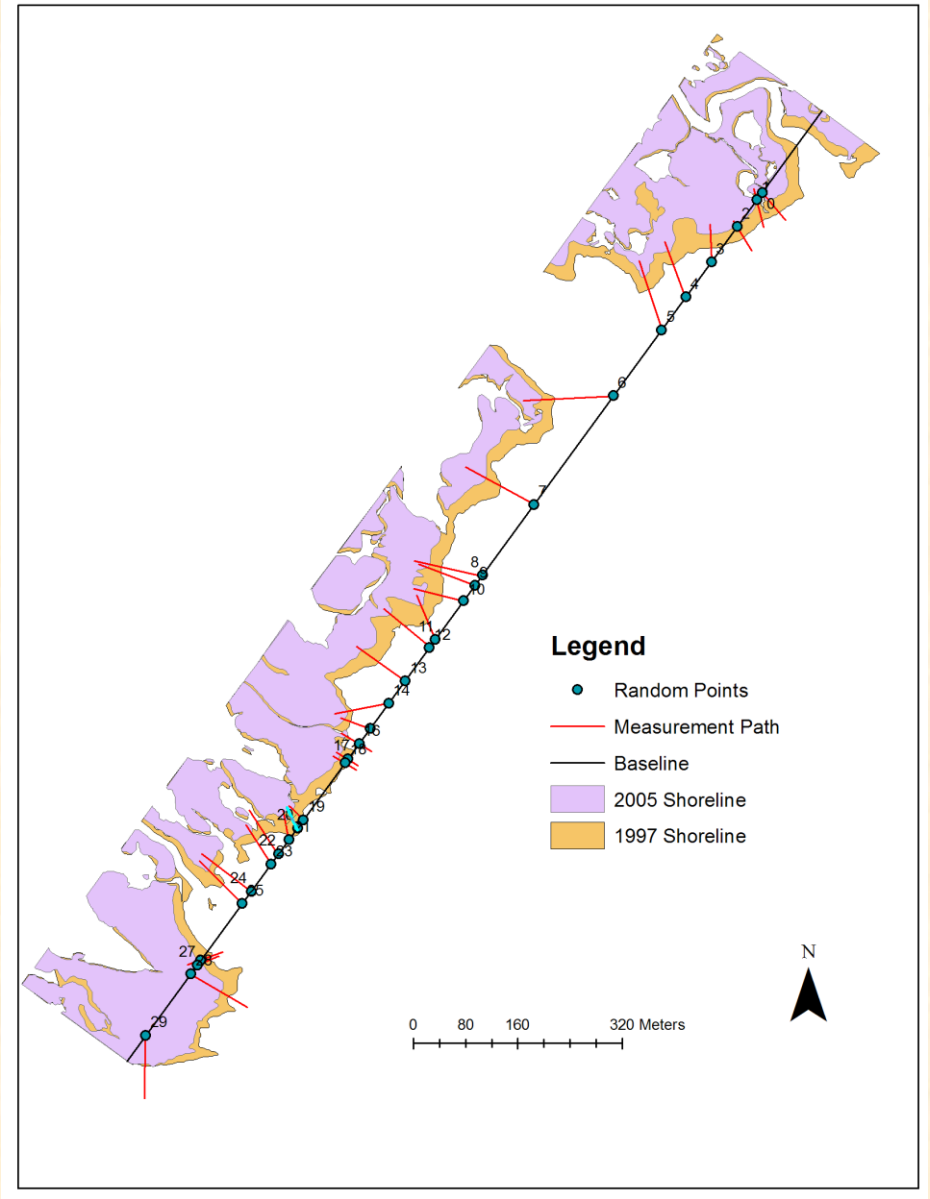
Creation of Shoreline GIS Layers

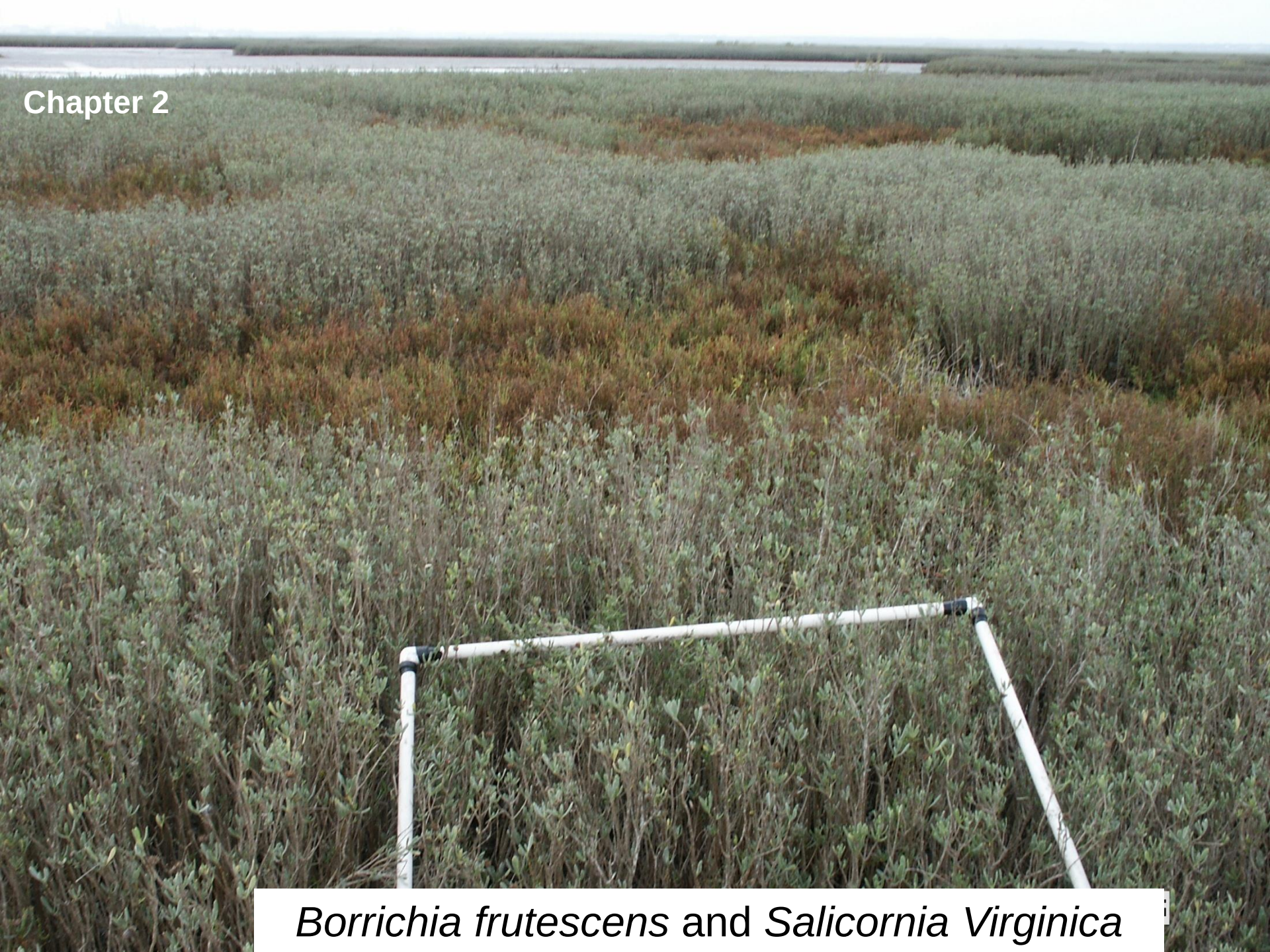
- Shoreline manually digitized onscreen for each image.

- Difference in shoreline area calculated in the GIS



Estimation of Shoreline Retreat




Chapter 2
Borrichia frutescens and *Salicornia Virginica*


1. 4. 2006


11.15.2005

Data

Two different sources of imagery

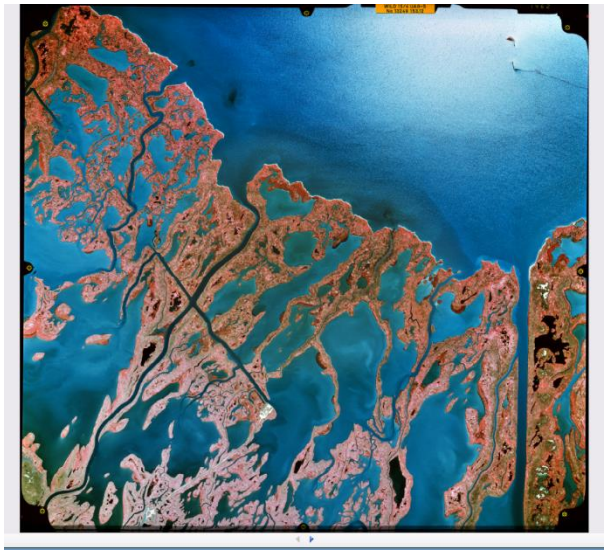
1997

- Traditional color infrared image.
- Color transparency was scanned to make it digital
- No spatial information

2005

- Acquired using digital mapping camera.
- Rectified using onboard GPS
- Color infrared

1997



2005